

CHAPTER 5

GROUND PYROTECHNIC SIGNALS

Ground pyrotechnic signals are classified as either handheld or ground smoke signals. They are used for signaling and illuminating missions.

5-1. DESCRIPTION

Ground pyrotechnic signals rise to a height of 180 to 250 meters before functioning, unlike the old smoke grenades that functioned either on impact or shortly after firing. There are two types of pyrotechnic signals:

a. **Handheld Signals.** These signals are issued in their own launching mechanism and are designed to reach a minimum height of 200 meters. This group of signals includes five-star clusters, single-star parachutes, and smoke parachutes. Handheld signals have replaced all rifle-projected pyrotechnic signals and chemical grenades.

b. **Ground Smoke Signals.** These signals are self-contained units used by ground soldiers to signal aircraft or to convey information through a prearranged signal. The signal consists of a cylindrical smoke pellet, a fuze (thermalite-type ignitacord), an igniter cap, an internal retaining ring, and a striker ring assembled in an aluminum photocan container. These signals produce a smoke cloud that lasts 13 to 30 seconds. They replace rifle-projected smoke signals.

5-2. CAPABILITIES AND USES

Ground pyrotechnic signals are capable of signaling for communication or illuminating a small area.

a. **Communication.** Effective control of units on the battlefield depends largely on communication. Radio, telephone, voice, messenger, and arm-and-hand signals are communication means that may be ineffective in certain tactical situations. Pyrotechnic signals are used in such situations to supplement or to take the place of normal communication means. Pyrotechnic signals are prescribed at command level and are prearranged in accordance with SOPs.

b. **Illumination.** The illumination capabilities of pyrotechnic signals are somewhat limited because of their size. They can be used, however, to light a small area for short periods when two or more illuminating signals are used at the same time.

5-3. HANDHELD SIGNALS

Star clusters, star parachutes, and smoke parachutes are three handheld signals used by the Army.

a. **Star Clusters.** Star clusters are used for signaling and illuminating. They are issued in an expendable launcher, which consists of a launching tube and firing cap (1, 2, 3, and 4, Figure 5-1). These signals produce a cluster of five free-falling pyrotechnic stars, clusters, and smoke parachutes.

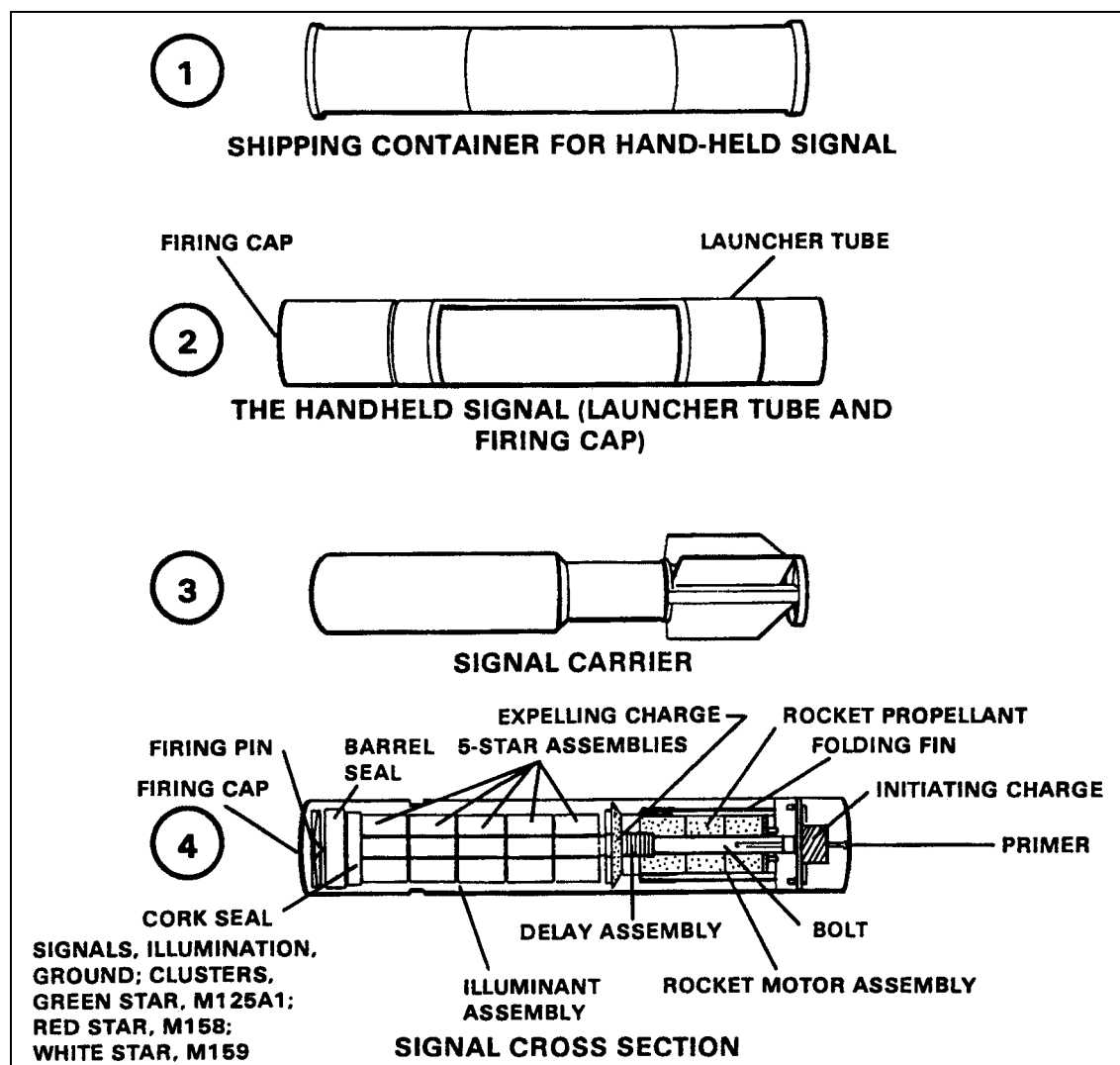


Figure 5-1. Ground pyrotechnic signals.

(1) *Types.* The current types of star clusters include the M125 and M125A1 (green star), the M158 (red star), and the M159 (white star).

(2) *Operation.* Operation of handheld signals should be as follows: (This will not always agree with the instructions found on the launcher tube. For more detailed information on safety and precautions, refer to TM 9-1370-206-10.)

(a) Hold the signal in your left hand, red-knurled band down, with your little finger in alignment with the red band (Figure 5-2).

(b) Withdraw the firing cap from the upper end of the signal.

(c) Point the ejection end of the signal away from your body and slowly push the firing cap onto the signal until the open end of the cap is aligned with the red band.

(d) Grasp the center of the signal firmly with your left hand, holding your elbow tight against your body with the signal at the desired trajectory angle and the firing cap at the bottom. Turn your head down and away from the signal to avoid injury to your face and eyes from particles ejected by the small rockets (Figure 5-2).

(e) Strike the bottom of the cap a sharp blow with the palm of your right hand or strike it on a hard surface, keeping your left arm rigid.

NOTE: Before firing the signal, the firer must make sure there is enough overhead clearance.

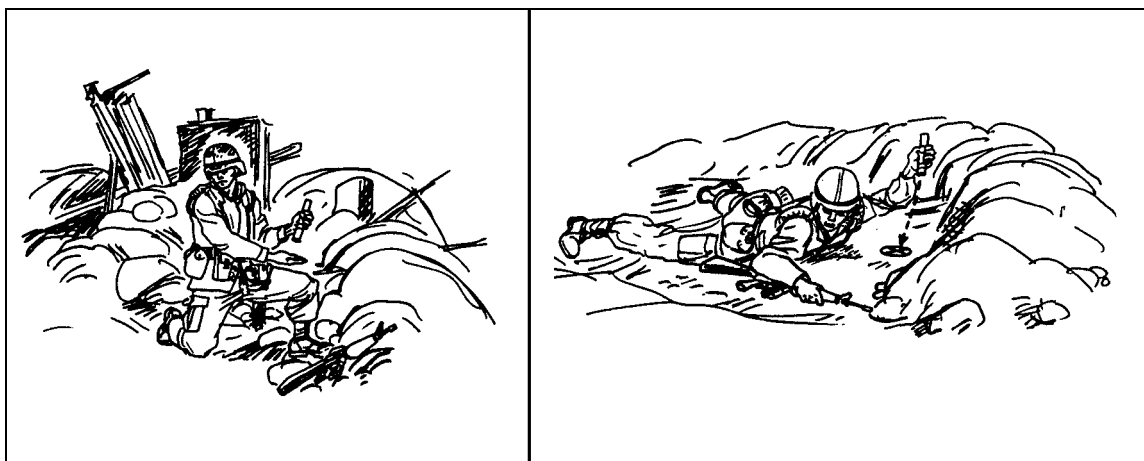


Figure 5-2. Firing the handheld signal.

(3) *Function.* When the firing cap is struck, the firing pin is forced into the base of the launcher tube at the primer. When the primer is struck, the flash from the primer ignites an initiating charge of black powder at the base of the signal. Gases from the burning initiating charge expel the signal from the launcher (rocket barrel) with a slight recoil. As the signal is expelled, four flexible steel fins unfold to stabilize the signal during flight. After the signal rises about 6 meters, the rocket motor, which was ignited by the propelling gases, begins to burn fully, forcing the signal to a height of 200 to 215 meters. At that point, a delay element ignites an ejection charge, which in turn forces the five-star illumination cluster out of the nose of the signal body.

(4) *Firing data.* Star clusters burn 6 to 10 seconds. Their rate of descent is 14 meters each second.

b. **Star Parachutes.** Star parachutes are also used for signaling and illuminating. They are issued in an expendable launcher that consists of a launching tube and a firing cap. These signals produce a single parachute-suspended illuminant star.

(1) *Types.* The current types of star parachutes include the M126A1 (red star), the M127A1 (white star), and the M195 (green star).

(2) *Operation.* These signals are fired in the same manner as the star clusters.

(3) *Function.* These signals function in the same manner as the star clusters.

(4) *Firing data.* The M126- and M127-series star parachutes rise to a height of 200 to 215 meters. The M126 burns for 50 seconds, and the M127 burns for 25 seconds. The average rate of descent for either is 2.1 meters each second. The signals can be seen for 50 to 58 kilometers at night.

c. **Smoke Parachutes.** Smoke parachutes are for signaling only. They are issued in an expendable launcher that consists of a launching tube and a firing cap. These signals produce a single perforated colored smoke canister that is parachute-suspended.

(1) *Types.* The current types of smoke parachutes include the M128A1 (green smoke), the M129A1 (red smoke), and the M194 (yellow smoke).

(2) *Operation.* These signals are fired in the same manner as the star clusters.

(3) *Function.* These signals function in the same manner as the star clusters.

(4) *Firing data.* Smoke parachutes rise to a height of 200 to 215 meters. The signals emit smoke for 6 to 18 seconds, forming a smoke cloud that persists for 60 seconds. Their rate of descent is 4 meters each second.

5-4. SURFACE TRIP FLARES

Surface trip flares outwardly resemble antipersonnel mines or hand grenades (Figure 5-3). Their primary use is to warn of infiltrating troops by illuminating the field. They are also used as signals or booby traps. The flares produce 50,000 candlepower of illumination.

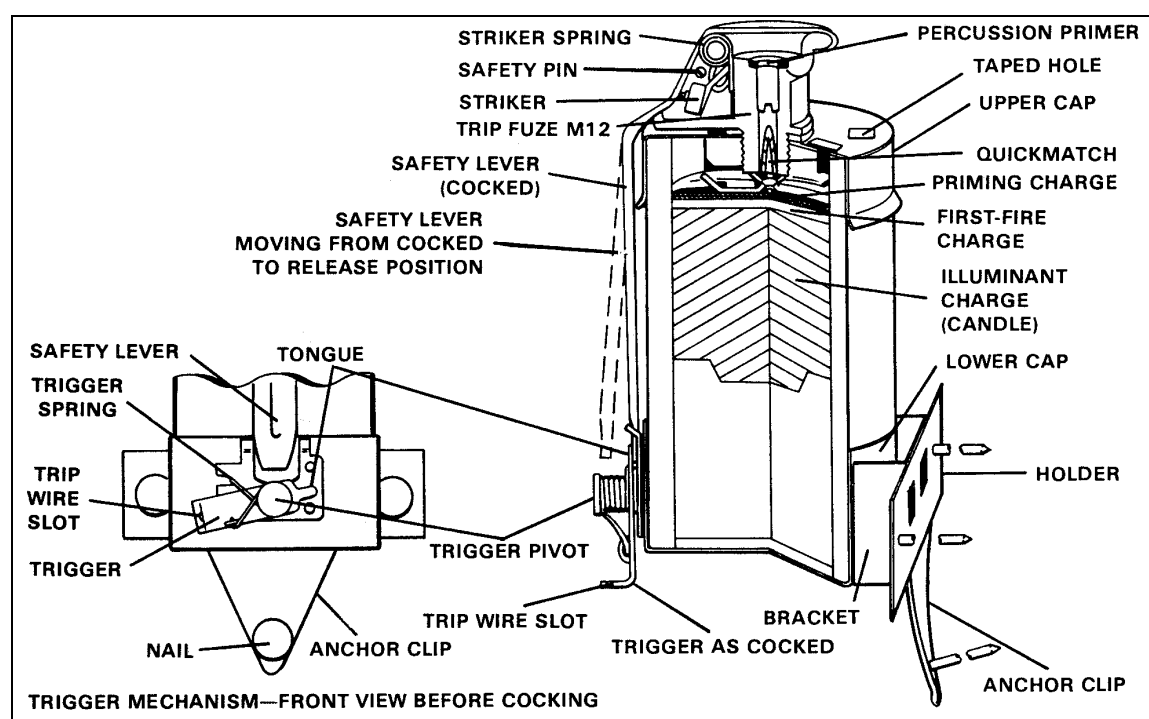


Figure 5-3. Surface trip flares.

5-5. SIMULATORS

Simulators are used in training to imitate the sounds and effects of combat detonations.

a. The booby trap simulator, M117, (Figure 5-4) is used during training and military exercises. This device allows training in the installation and use of booby traps. When tripped or activated, the simulator functions with a flash and loud report.

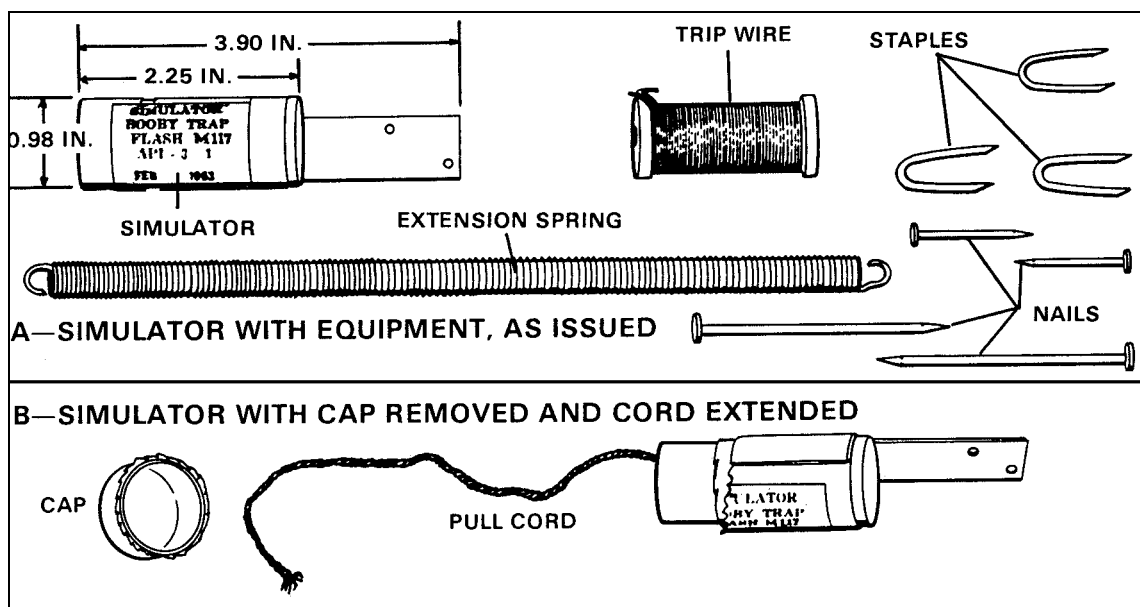


Figure 5-4. M117 simulator.

b. The ground burst simulator, M115A2, (Figure 5-5) is used to create battle noises and flash effects during training. It produces a high-pitched whistle that lasts 2 to 4 seconds. The detonation produces a flash and loud report.

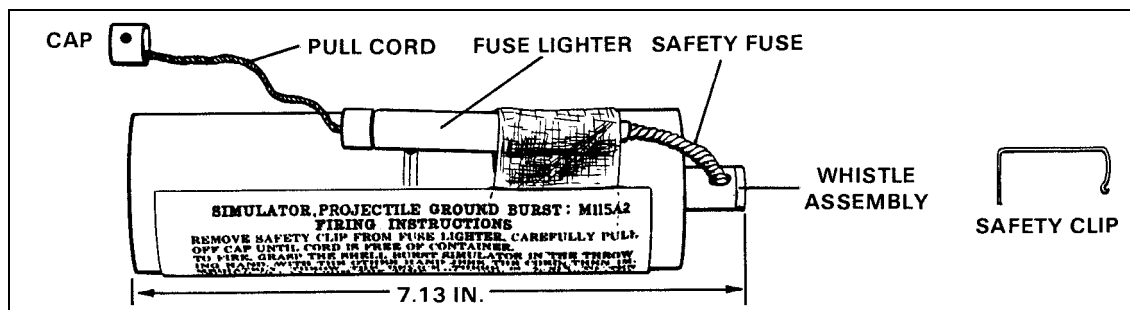


Figure 5-5. M115A2 simulator.

c. The hand grenade simulator, M116A1, (Figure 5-6) is used to create battle noises and flashes during training. It differs from the ground burst simulator in that it is shorter and does not emit a high-pitched whistle before detonation. The hand grenade simulator is thrown in the same manner as a live grenade. It creates a flash and loud report 5 to 10 seconds after ignition.

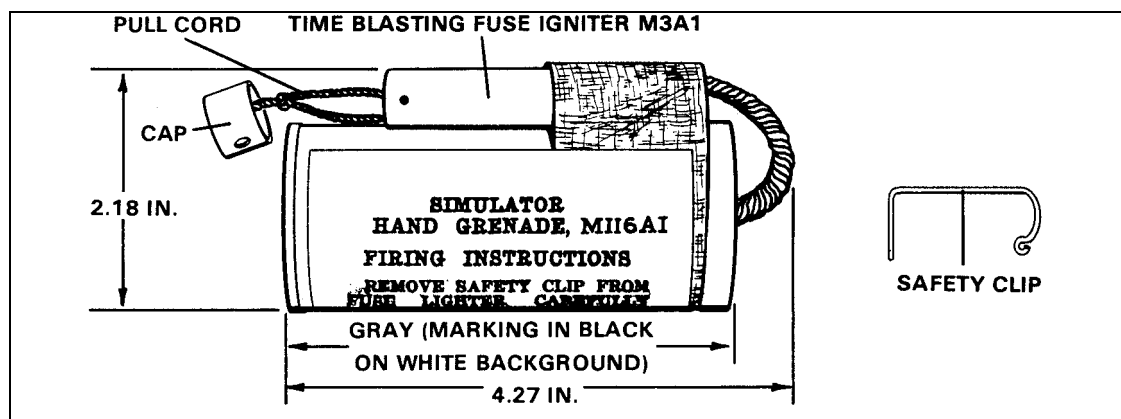


Figure 5-6. M116A1 simulator.

d. The explosive simulator, M80, (Figure 5-7) is used during training and in deactivation training programs. It simulates hand grenades, booby traps, land mines, and rifle or artillery fire.

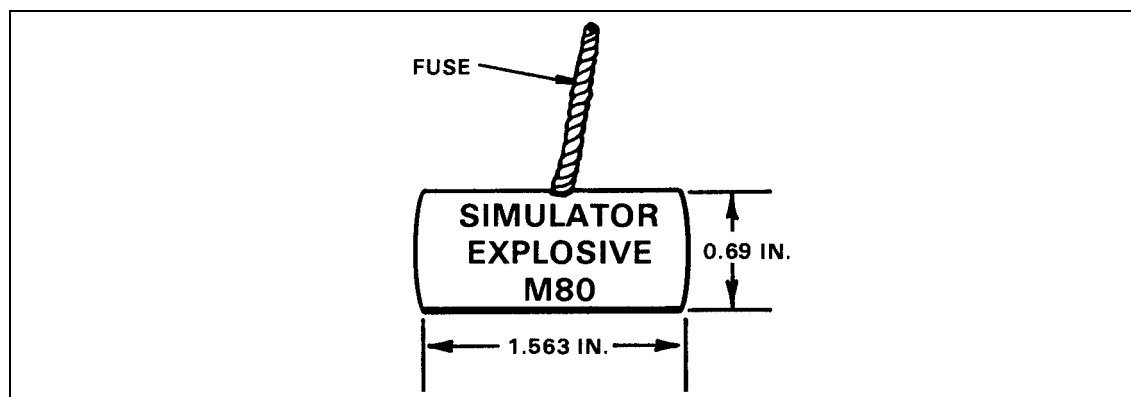


Figure 5-7. M80 simulator.

5-6. ILLUMINATION GROUND SIGNAL KITS

The pen gun flare supports the small unit leader in fire control, maneuver, and initiating operations such as ambushes.

a. **Kit 1.** This pen gun flare has a threaded projector with the projectiles contained in a cloth bandoleer. Each of the signals listed below may be fired from a handheld projector while in a bandoleer.

- Red illumination ground signal, M187.
- White illumination ground signal, M188.
- Green illumination ground signal, M189.
- Amber illumination ground signal, M190.

(1) *Contents.* The projector and the bandoleer plus seven projectiles or signals make up the signal kit (Figure 5-8). All signals may be obtained and fired separately. The M185 red signal kit contains only red signals. The M186 signal kit contains three red, two white, and two green signals.

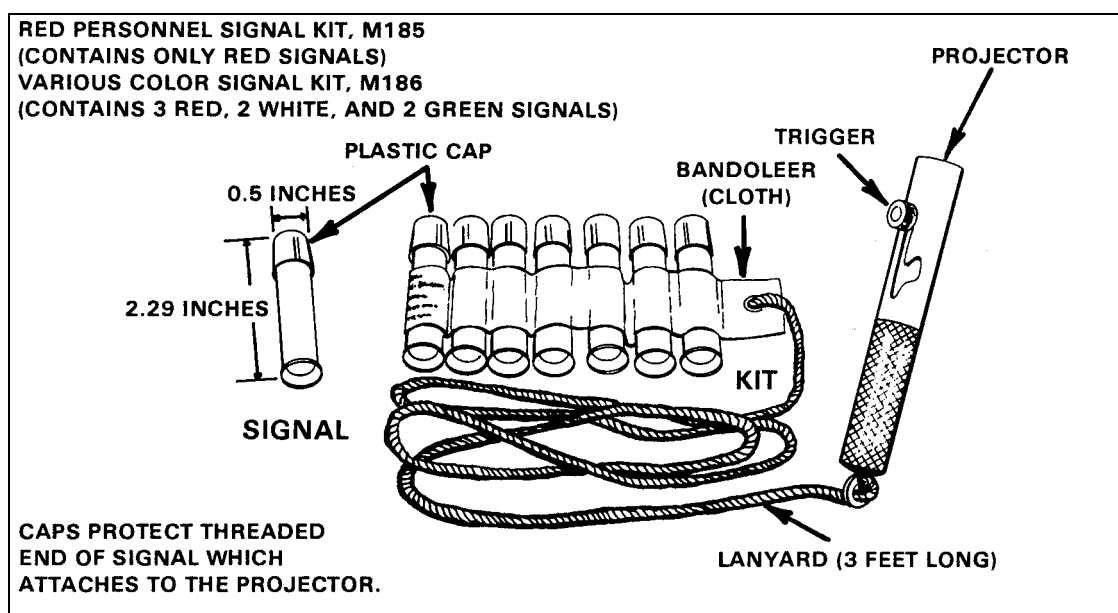


Figure 5-8. Signal kit 1.

(2) *Operation.* Select the signal to be fired by color. If the bandoleer contains more than one signal of the chosen color, use the one farthest from the lanyard. Remove and discard the plastic cap. Cock the projector by moving the trigger to the safety slot. Carefully thread the projector onto the signal, taking care not to dislodge the trigger from the safety slot. Aim in the chosen direction. Fire by moving the trigger to the bottom of the slot and releasing it with a snap. If the expended signal is on the end of the bandoleer or if the signals between the expended signal and the end have been used, cut the bandoleer and discard the waste. Return the partly used kit to the barrier bag and seal with tape.

b. **Kit 2.** This pen gun flare has a force-fitted projector and a plastic bandoleer before being fired.

(1) *Contents.* This kit contains only red illumination ground signals. The projector and the bandoleer plus seven signals make up this kit (Figure 5-9). The burning time for these signals is 10 seconds at 100,000 candlepower.

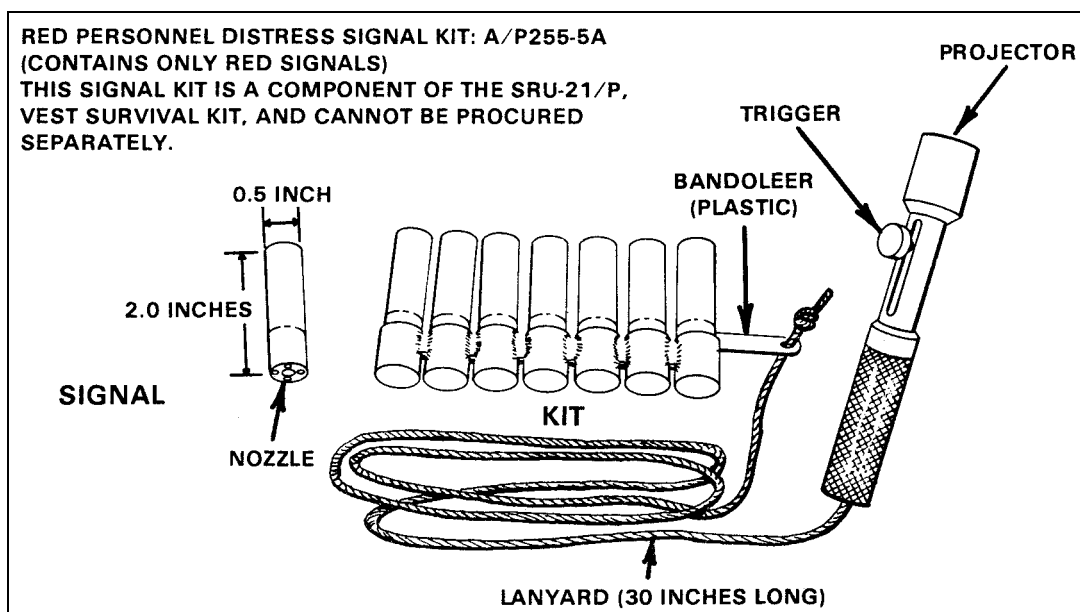


Figure 5-9. Signal kit 2.

(2) *Operation.* To operate this signal, select and remove the signal to be fired from the bandoleer using the one farthest from the lanyard. Carefully insert the nozzle end of the signal into the projector as far as it will go. Fire by pulling the trigger knob to the rear of the slot and releasing it with a snap. Retain the bandoleer for future use. Return the partly used kit to the plastic bag and seal with tape.